CLAIMS

1. A stem cell marker characterized by binding to a GCTM-5 antibody or active fragment thereof.

2. A stem cell marker according to claim 1 which migrates on an SDS-PAGE gel with an apparent molecular weight of 50kDa.

3. A stem cell marker according to claim 1 or 2 wherein the GCTM-5 antibody or fragment is produced by a hybridoma having an ECACC accession number 03101603.

4. A stem cell marker according to any one of claims 1 to 3 including a GCTM-5 epitope or equivalent or a GCTM-5 antigen.

5. A stem cell marker according to any one of claims 1 to 4 of a ductal cell including a biliary cell or a biliary epithelial cell.

6. A stem cell marker according to any one of claims 1 to 5 of a hepatoblast.

7. A stem cell marker according to any one of claims 1 to 6 of a hepatic, pancreatic or endodermal stem cell.

8. A stem cell marker according to any one of claims 1 to 7 of a hepatic stem cell or progenitor cell.

9. A stem cell marker according to any one of claims 1 to 7 of a pancreatic stem cell or progenitor cell.

10. A detector of a cell type which identifies on the cell type a cell marker according to any one of claims 1 to 9.

11. A detector according to claim 10 which is an antibody, fragment or equivalent thereof, ligand or complimentary molecule to the cell marker.

12. A detector according to any one of claims 10 or 11 which is an antibody, fragment or equivalent thereof.

13. A detector according to any one of claims 10 to 12 which is a GCTM-5 antibody or active fragment thereof.

14. A detector according to any one of claims 10 to 13 which can compete against a GCTM-5 antibody for binding.

15. A detector according to claim 13 that is produced by a hybridoma having an ECACC accession number 03101603.

16. A detector according to any one of claims 10 to 15 which detects the cell marker on a stem cell.

17. A detector according to any one of claims 10 to 16 which detects the cell marker on a sub population of stem cells.

18. A detector according to any one of claims 10 to 17 wherein the stem cell is a hepatoblast.

19. A detector according to claim 17 or 18 wherein the stem cell is a hepatic stem cell or a hepatic progenitor cell.

20. A detector according to claim 17 or 18 wherein the stem cell is a pancreatic stem cell or a pancreatic progenitor cell.

21. A detector according to any one of claims 16 to 18 wherein the stem cell is a cell of the biliary epithelium.

22. A detector according to any one of claims 16 to 21 where in the stem cell is proliferating.

23. A hybridoma which produces an antibody to a cell marker according to any one of claims 1 to 9.

24. A hybridoma which produces a GCTM-5 antibody or fragment thereof.

25. A hybridoma according to claim 24 which has an ECACC accession number 03101603.

26. A method of identifying a sub-population of stem cells in a cell sample, said method including

identifying the stem cells which express a marker according to any one of claims 1 to 9.

27. A method according to claim 26 wherein the subpopulation of stem cells includes a hepatoblast.

28. A method according to claim 26 or 27 wherein the subpopulation includes a hepatic stem cell or a hepatic progenitor cell.

29. A method according to claim 26 or 27 wherein the subpopulation includes a pancreatic stem cell or a pancreatic progenitor cell.

30. A method according to claim 26 or 27 wherein the subpopulation includes a biliary cell or a biliary epithelial cell.

31. A method according to any one of claims 27 to 30 wherein the stem cell or progenitor cell is proliferating.

32. A method according to any one of claims 26 to 32 wherein the stem cells are identified by a GCTM-5 antibody or fragment thereof.

33. a method according to claim 32 wherein the GCTM-5 antibody or fragment thereof is produced by a hybridoma having an ECACC accession number 03101603.

34. A method according to any one of claims 26 to 33 further comprising subjecting the stem cells to markers selected from the group including N-CAM, HEA –125, CK-19, harmonin and Ep-CAM.

35. A method of isolating a sub population of stem cells, said method comprising isolating the stem cells which express a marker, said marker according to any one of claims 1 to 9.

36. A method according to claim 35 wherein the subpopulation of stem cell includes a hepatoblast.

37. A method according to claim 35 or 36 wherein the subpopulation of stem cells includes a hepatic stem cell or a hepatic progenitor cell.

38. A method according to claim 35 or 36 wherein the subpopulation of stem cells includes a pancreatic stem cell or a pancreatic progenitor cell.

39. A method according to claim 35 or 36 wherein the subpopulation of stem cells includes a biliary cell or a biliary epithelial cell.

40. A method according to any one of claims 35 to 39 wherein the stem cell or progenitor cell is proliferating.

41. A method according to any one of claims 35 to 40 wherein the cells are isolated using a GCTM-5 antibody, fragment or equivalent thereof.

42. A method according to claim 41 wherein the GCTM-5 antibody or fragment thereof is produced by a hybridoma having an ECACC accession number 03101603.

43. A method according to any one of claims 35 to 42 further including isolating cells that select for or against markers, said markers selected from the group including N-CAM, HEA-125, CK-19, harmonin and Ep-CAM.

44. A subpopulation of cells which express a marker according to any one of claim 1 to 9.

45. A subpopulation of stem cells prepared by the method according to any one of claims 35 to 43.

46. A subpopulation according to claim 44 or 45 including a heptablast.

47. A subpopulation according to claim 44 or 46 including hepatic stem cells or hepatic progenitor cells.

48. A subpopulation according to claim 44 or 46 including pancreatic stem cells or pancreatic progenitor cells.

49. A subpopulation according to claim 44 or 46 including biliary cells or biliary epithelial cells.

50. A subpopulation according to any one of claim 44 to 49, wherein the stem cells or progenitor cells are proliferating.

51. A subpopulation according to any one of claims 44 to 50 including liver cells.

52. A subpopulation according to any one of claims 44 to 50 including pancreatic cells.

53. An isolated cell which expresses a marker according to any one of claims 1 to 9.

54. An isolated cell derived from a subpopulation according to any one of claims 44 to 52.

55. A isolated cell according to any one of claims 53 or 54 which is a hepatoblast.

56. An isolated cell according to any one of claims 53 to 55 which is a hepatic stem cell or a hepatic progenitor cell.

57. An isolated cell according to any one of claims 53 to 55 which is a pancreatic stem cell or a pancreatic progenitor cell.

58. An isolated cell according to any one of claims 53 to 55 which is a biliary cell or a biliary epithelial cell.

59. An isolated cell according to any one of claims 53 to 58 wherein the stem cell or progenitor cell is proliferating.

60. A method of culturing a hepatic or pancreatic stem cell or progenitor cell, said method comprising

isolating the cells which express a marker according to any one of claims 1 to 9; and

culturing the cells.

61. A method according to claim 60 wherein the isolated stem cell is a hepatoblast.

62. A method according to claim 60 or 61 wherein the hepatic or pancreatic stem cell or progenitor cell is further differentiated to a cell selected from the group including a hepatoblast, liver, hepatic or pancreatic cell.

63. A method according to claim 62 wherein the hepatic stem cell is further differentiated to a liver cell.

64. A method according to claim 62 wherein the hepatic stem cell is further differentiated to a pancreatic cell.

65. A method according to any one of claims 60 to 64 wherein the hepatic stem cell is proliferating.

66. A use of the cells which express a marker according to any one of claims 1 to 9, said use selected from the group including transplantation, ex vivo expansion, reprogramming to generate other cell types and for identifying new therapeutic agents that may affect how these cells live, grow, replicate, differentiate and die.

67. A method of treating a liver disorder in a patient, said method comprising:

isolating a liver stem cell by a method according to any one of claims 35 to 43; and

transferring the liver stem cell to the patient.

68. A method according to claim 67 wherein the liver stem cell is a hepatoblast.

69. A method according to claim 67 or 68 wherein the liver stem cell is proliferating.

70. A method according to any one of claims 67 to 69 wherein the liver stem cell is caused to further differentiate to a liver cell.

71. A method according to any one of claims 69 to 70 wherein the liver disorder is selected from the group including PBC, EHBA or ALD.

72. A method of treating a pancreatic disorder in a patient, said method comprising:

isolating a liver stem cell by a method according to any one of claims 35 to 43; and

transferring the liver stem cell to the patient.

73. A method according to claim 72 wherein the liver stem cell is a hepatoblast.

74. A method according to claim 72 or 73 wherein the liver stem cell is proliferating.

75. A method according to any one of claims 72 to 74 wherein the liver stem cell is caused to further differentiate to a pancreatic cell.

76. A method according to any one of claims 72 to 75 wherein the pancreatic disorder is diabetes.

77. A method of treating a liver or pancreatic cancer, said method including

delivering a toxin conjugated to a GCTM-5 antibody or active fragment thereof to a liver or pancreatic stem cell or liver or pancreatic progenitor cell in the liver or pancreatic cancer, wherein the cell expresses a marker according to any one of claims 1 to 9.

78. A method according to claim 77 wherein the liver or pancreatic stem cell or progenitor cell is proliferating.

79. A method of diagnosing or monitoring a liver or pancreatic condition in a patient, said method comprising detecting GCTM-5 antigen, epitope or equivalent in a biological sample.

80. A method according to claim 79 wherein the GCTM-5 antigen, epitope or equivalent is detected with a GCTM-5 antibody, or fragment thereof.

81. A method according to claim 80 wherein the GCTM-5 antibody or fragment is produced by a hybrodoma having an ECACC accession number 03101603.

82. A method according to any one of claims 79 to 81 wherein the biological sample is body fluid or a tissue sample.

83. A method according to any one of claims 79 to 82 wherein the liver condition is selected from the group including PBC, EHBA, ALD, transplantation of liver stem cells and *in vivo* expansion of liver stem cells.

84. A method according to any one of claims 79 to 82 wherein the pancreatic condition is selected from the group including diabetes, pancreatic malignancies,

transplantation of pancreatic stem cells and *in vivo* expansion of pancreatic stem cells.

85. A kit for detecting a cell marker said kit including a detector which detects the marker according to any one of claims 1 to 9.

86. A kit according to claim 85 which detects a cell marker on a subpopulation of stem cells or in a biological sample.

87. A kit according to claim 85 or 86 which detects the cell marker on a hepatoblast.

88. A kit according to any one of claim 85 to 87 which detects the cell marker on a hepatic stem cell or a hepatic progenitor cell.

89. A kit according to any one of claim 85 to 88 which detects the cell marker on a pancreatic stem cell or a pancreatic progenitor cell.

90. A kit according to any one of claim 85 to 87 which detects the cell marker on a biliary cell or a biliary epithelial cell.

91. A kit according to any one of claim 85 to 90 which detects the cell marker on a stem cell that is proliferating.

92. A kit according to any one of claim 85 to 91 which detects the cell marker in a biological sample including cell culture, tissue culture, conditioned medium, tissue sample, blood, serum, plasma and other bodily fluids and biopsy samples.

93. A kit according to any one of claims 85 to 92 wherein the detector is a GCTM-5 antibody or active fragment thereof.

94. A kit according to claim 93 wherein the antibody is produced by a hybridoma having an accession number ECACC 03101603.

95. A kit for isolating a subpopulation of stem cells, said kit comprising a detector for detecting cells expressing a marker according to any one of claims 1 to 9 and a means to separate the cells detected by the detector.

96. A kit according to claim 95 which isolates a hepatoblast.

97. A kit according to claim 95 or 96 which isolates a hepatic stem cell or a hepatic progenitor cell.

98. A kit according to any one of claim 95 to 97 which isolates a pancreatic stem cell or a pancreatic progenitor cell.

99. A kit according to any one of claim 95 to 98 which isolates a biliary cell or a biliary epithelial cell.

100. A kit according to any one of claim 95 to 99 which isolates a stem cell that is proliferating.

101. A kit according to any one of claim 95 to 100 which isolates a stem cell from a biological sample including cell culture, tissue culture, conditioned medium, tissue sample, blood, serum, plasma and other bodily fluids and biopsy samples.

102. A kit according to any one of claims 95 to 101 wherein the detector is a GCTM-5 antibody or active fragment thereof.

103. A kit according to claim 102 wherein the antibody is produced by a hybridoma having an accession number ECACC 03101603.